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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,026	05/10/2006	Mats Stromblad	09546-028US1 55869 US SB/	3878
26211 7590 04/01/2010 FISH & RICHARDSON P.C. P.O. BOX 1022 MINNEAPOLIS, MN 55440-1022			EXAMINER RUBY, TRAVIS C	
			ART UNIT 3744	PAPER NUMBER
			NOTIFICATION DATE 04/01/2010	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PATDOCTC@fr.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/579,026	<b>Applicant(s)</b> STROMBLAD, MATS	
	<b>Examiner</b> TRAVIS RUBY	<b>Art Unit</b> 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 12-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 May 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/10/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore,
  - a. the flow passages of the plate heat exchanger of Claim 1,
  - b. counter flow or parallel flow of Claim 22 must be indicated,
  - c. the helical shaped conduit of Claim 19must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet"

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pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Plate Heat Exchanger with Superheat Conduit".

4. Applicant is reminded of the proper content of an abstract of the disclosure.

A patent abstract is a concise statement of the technical disclosure of the patent and should include that which is new in the art to which the invention pertains. If the patent is of a basic nature, the entire technical disclosure may be new in the art, and the abstract should be directed to the entire disclosure. If the patent is in the nature of an improvement in an old apparatus, process, product, or composition, the abstract should include the technical disclosure of the improvement. In certain patents, particularly those for compounds and compositions, wherein the process for making and/or the use thereof are not obvious, the abstract should set forth a process for making and/or use thereof. If the new technical disclosure involves modifications or alternatives, the abstract should mention by way of example the preferred modification or alternative.

The abstract should not refer to purported merits or speculative applications of the invention and should not compare the invention with the prior art.

Where applicable, the abstract should include the following:

- (1) if a machine or apparatus, its organization and operation;
- (2) if an article, its method of making;
- (3) if a chemical compound, its identity and use;
- (4) if a mixture, its ingredients;
- (5) if a process, the steps.

Extensive mechanical and design details of apparatus should not be given.

5. The abstract of the disclosure is objected to because it is not a concise statement of the technical disclosure. In addition, the phrase "porthole channel" is used repetitively without

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specifying which channel number it is referring to. Correction is required. See MPEP § 608.01(b).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 12-15 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (US4815534) in view of Takao et al (JP09-138008).

**Re Claim 12.** Fuerschbach teaches a heat transfer device comprising a plate heat exchanger (ref 10), wherein the plate heat exchanger includes a plate package of heat transfer plates, which are arranged to form between the plates first passages for a heat transfer medium to be cooled and second passages for a cooling agent, wherein (Figure 2; Column 5 lines 46-49; Column 5 line 66 to Column 6 line 8):

the plate package includes a first porthole channel (ref 40a) and a second porthole channel (ref 40), which communicate with the first passages, and a third porthole channel (ref 41) and a fourth porthole channel (ref 41a), which communicate with the second passages (Figure 2; Column 5 line 46 to Column 6 line 8);

the first porthole channel (ref 40a) forms at least a part of an inlet channel to supply the heat transfer medium to the plate heat exchanger;

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the second porthole channel (ref 40) forms at least a part of an outlet channel to discharge the heat transfer medium from the plate heat exchanger;

the third porthole channel (ref 41) forms at least a part of an inlet channel to supply the cooling agent to the plate heat exchanger;

the fourth porthole channel (ref 41a) forms at least a part of an outlet channel to discharge the cooling agent from the plate heat exchanger;

the heat exchanger device includes a conduit (ref IC) extending into the inlet channel for the cooling agent to supply the cooling agent to the third porthole channel and the second passages (Figure 2; It is obvious that an inlet conduit would be connected to the cooling medium inlet since some form of a pipe is necessary to transfer the cooling agent), and

Fuerschbach fails to teach that wherein the conduit includes a conduit portion extending into and out of the outlet channel for the cooling agent such that heat exchange takes place between the cooling agent in the conduit portion and the cooling agent in the outlet channel. Takao et al teaches wherein the conduit includes a conduit portion (ref 9) extending into and out of the outlet channel for the cooling agent such that heat exchange takes place between the cooling agent in the conduit portion and the cooling agent in the outlet channel (abstract; Figure 1 illustrates that a portion of the conduit 8a goes into one side of the heat exchanger 3 before entering the expansion valve Exp1. The heat exchanger has two inlets, air inlet and refrigerant inlet, and two outlets, air outlet and refrigerant outlet. The conduit 9 enters the air outlet portion, which is the cooling agent. This would outlet would be analogous to the fourth porthole channel of a plate heat exchanger). In view of Takao et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the heat exchanger of Fuerschbach

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to include an intercooler in the heat exchanger since it increases the efficiency of the refrigeration system.

**Re Claim 13-15.** Fuerschbach teaches the outlet channel for the cooling agent includes the fourth porthole channel (ref 41a) and a pipe (ref OC) which extends outwardly from the fourth porthole channel and the plate package (Figure 2; Column 5 line 46 to Column 6 line 8).

Fuerschbach fails to teach that wherein the conduit portion extends at least into and out of the pipe and fourth porthole channel in a U-shaped path. Takao et al teaches wherein the conduit portion extends at least into and out of the heat exchanger in a U-shaped path. (abstract; Figure 1 illustrates that a portion of the conduit 8a goes into one side of the heat exchanger 3 before entering the expansion valve Exp1). In view of Takao et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the heat exchanger of Fuerschbach to include an intercooler that enters in through a pipe and porthole in the heat exchanger since it increases the efficiency of the refrigeration system. It would have been obvious to extend the conduit fully through the pothole in order to achieve the optimal heat transfer and efficiency. It would have been obvious to make the conduit a U-shape, since this shape allows for easy return of the fluid and allows for increased heat exchange in the heat exchanger.

**Re Claim 20.** Fuerschbach teaches a plate heat exchanger but fails to teach that the conduit is included in a cooling agent circuit, which includes a compressor, a condenser, an expansion valve and an evaporator that includes the plate heat exchanger. Takao et al teaches

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that the conduit is included in a cooling agent circuit (Figure 1), which includes a compressor (ref 1), a condenser (ref 6), an expansion valve (ref Exp1) and an evaporator (ref 3) (Figure 1, abstract). In view of Takao et al's teachings, it would have been obvious to one of ordinary skill in the art to use the plate heat exchanger of Fuerschbach in the circuit of Takao since the two heat exchangers are art recognized equivalents of one another since they both exchange heat between two materials.

**Re Claim 21.** Fuerschbach fails to teach that the conduit portion is located between the condenser and the expansion valve. Takao et al teaches that the conduit portion is located between the condenser and the expansion valve (abstract, Figure 1). In view of Takao et al's teachings, it would have been obvious to one of ordinary skill in the art to use the plate heat exchanger of Fuerschbach in the circuit of Takao since the two heat exchangers are art recognized equivalents of one another since they both exchange heat between two materials. In addition, it would have been obvious to locate the conduit portion in between the condenser and expansion valve, since this is known to increase the efficiency of the refrigeration system.

**Re Claim 22.** Fuerschbach teaches that the inlet and outlet channels are arranged such that the heat transfer medium flows through the first passages in a counterflow direction or a parallel flow direction in relation to the cooling agent flow in the second passages (Figure 2; Column 5 line 46 to Column 6 line 8).



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8. Claims 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (US4815534) in view of Takao et al (JP09-138008) and in further view of Watanabe et al (US6928833B2).

**Re Claim 16 & 17.** Fuerschbach as modified by Takao et al teaches the conduit extending into the heat exchanger but fails to teach that the conduit portion includes surface enlarging members including flanges, which are provided on the conduit portion and extend in the outlet channel. Watanabe et al teaches that the conduit (ref 11) portion includes surface enlarging members including flanges (ref 13), which are provided on the conduit portion and extend in the outlet channel (Figure 1). In view of Watanabe et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the conduit of Takao et al to include flanges, since this would increase the surface area of the conduit, and thus increase the heat transfer to the conduit, which is well known in the art to increase the efficiency of the refrigeration system.

9. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuerschbach (US4815534) in view of Takao et al (JP09-138008) and in further view of Dienhart et al (US6189334B1).

**Re Claim 18.** Fuerschbach as modified by Takao et al fails to teach that the conduit portion extends in a path which is significantly longer than double the distance between an entrance position for the entrance of the conduit portion into the outlet channel and a position of

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the conduit portion located as far as possible from the entrance position. Dienhart et al teaches the conduit portion (ref 20) extends in a path which is significantly longer than double the distance between an entrance position for the entrance of the conduit portion into the outlet channel and a position of the conduit portion located as far as possible from the entrance position (Figure 2; Column 2 line 59 to Column 3 line 6). In view of Dienhart et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the conduit of Takao et al to be longer, since this would increase the surface area of the conduit, and thus increase the heat transfer to the conduit, which is well known in the art to increase the efficiency of the refrigeration system.

**Re Claim 19.** Fuerschbach as modified by Takao et al fails to teach that the conduit portion extends in a helical-shaped path in the outlet channel. Dienhart et al teaches that the conduit portion extends in a helical-shaped path (ref 20) in the outlet channel (Figure 2; Column 2 line 59 to Column 3 line 6). In view of Dienhart et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of invention to modify the conduit of Takao et al to be longer, since this would increase the surface area of the conduit, and thus increase the heat transfer to the conduit, which is well known in the art to increase the efficiency of the refrigeration system.

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***Conclusion***

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Radermacher et al (US5243837) teaches a subcooling system for a refrigeration cycle.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TRAVIS RUBY whose telephone number is (571)270-5760. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules or Cheryl Tyler can be reached on 571-272-6681 or 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Travis Ruby/  
Examiner, Art Unit 3744

/Frantz F. Jules/  
Supervisory Patent Examiner, Art Unit 3744